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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/037,044	12/31/2001	Laura C. Boudreau	T-5869	5554

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EXAMINER

NGUYEN, TAM M

ART UNIT PAPER NUMBER

1764

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/037,044	Applicant(s) BOUDREAU ET AL.	
	Examiner Tam M. Nguyen	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 50-52 is/are allowed.
- 6) ☒ Claim(s) 1-49 and 53-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/22/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Claims 1, 5, 6, 8-18, 25, 26, 28-49, 53, 54, and 56 are rejected under 35 U.S.C. 102(e) as being anticipated by Munson et al. (6,339,182).

Claim 1:

Munson discloses a method for separating olefins from a mixture comprising mono-olefins and diolefins by contacting the mixture with an olefin-complexing metal salt dissolved, dispersed, or suspended in an ionic liquid to selectively complex the di-olefins over the mono-olefins. Desorbing the mono-olefins from the metal salt/olefin complex. (See abstract; col. 2, lines 1-20; col. 3, lines 50-53; Example 2)

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Claims 5, 6, 8, 9, 25, 26, 28, and 29:

The metal salt comprises a Group IB (e.g., AgBF₄ and Cu salt). See col. 4, lines 32-40;

Table 3)

Claims 10 and 39:

The olefinic feed is a gaseous stream. (See col. 5, line 65)

Claims 30-31:

The non-olefins comprise paraffins including cycloparaffins. (See col. 3, lines 1-2)

Claims 18, 32-36:

The mono-olefins comprise ethylene which is produced from an cracker, Fischer-Tropsch synthesis, or paraffin dehydrogenation and is in an FCC unit. (See claims 10-15)

Claim 37:

The olefins are derived from the ethenolysis of heavier internal olefins. (See claim 16).

Claim 38:

Olefins are separated from a recycle stream in a Fischer-Tropsch synthesis. (See claim 17)

Claims 11 and 40:

The contacting step is in a distillation apparatus. (See abstract)

Claim 41:

Separating non-complex non-olefins from the metal salt/olefin complex by distillation. (See 5, lines 49-51).

Claims 12, 13, 42 and 43:

Munson does not specifically disclose that mono-olefins and diolefins are desorbed from the ionic liquid complex in the distillation. However, Munson discloses that the desorption step is effected in a packed tower or flash drum in using a combination of increasing temperature and lower pressure as disclosed in the present specification. Therefore, ~~therefore~~, it would be expected that the Munson olefins be desorbed from the complex in the distillation column.

Claims 14 and 44:

The olefins are contacted with olefin-complex metal salt in liquid stirred tanks. (See col. 5, line 65 through col. 6, line 1)

Claims 15 and 45:

The non-olefins are separated from the ionic liquid complex by decantation. (See col. 5, line 49-50)

Claims 16, 46 and 47:

The desorption step is in a regeneration apparatus. (See col. 5, lines 48-56)

Claims 17 and 48:

The ionic liquid solution removed from stripper is recycled back to the contacting zone. (See col. 6, lines 32-33).

Claim 24:

The ionic liquid is capable of forming a solution, suspension or dispersion with the olefin-complexing metal salt. (See claim 1)

Claim 49:

Sulfur, nitrogen and acetylene are removed from the olefinic feed. (See col. 3, line 62 though col. 4, line 10)

Claims 53 and 54:

The ionic liquid comprises tetrafluoroborate and 1-butyl-3-methylimidazolium. (See example 1 and table 1)

Claims 55 and 56:

The ionic liquid is prepared as claimed. (See example 2 and claim 22)

Claims 2-4 and 20-24 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Munson et al. (6,339,182).

The process of Munson is as discussed above.

Claims 20 and 22:

In addition, the presently claimed both mono-olefins and diolefins are complex with the ionic liquid complex would obviously have been provided as a results of contacting olefins with the ionic liquid complex because the Munson ionic liquid complex is the same as the claimed ionic complex. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection made above under 35 USC 102.

Claims 2, 21, and 23:

In addition, the presently claim claims that diolefins are desorbed from the ionic liquid complex would obviously have been provided as a results of desorbing olefins from the ionic complex. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection made above under 35 USC 102.

Claims 3 and 24:

The ionic liquid is capable of forming a solution, suspension or dispersion with the olefin-complexing metal salt. (See claim 1)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 4, 7, 19, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Munson et al. (6,339,182).

The process of Munson is as discussed above.

Claims 7 and 27:

Munson does not disclose that the metal salt is CuOTf. However, Munson discloses that the metal salt is a Cu(I). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Munson by using the claimed metal salt because one of skill in the art would use any Cu(I) salt including the claimed copper salts because it would be expected that any Cu(I) salt would be affect in the process of Munson.

Claim 19:

Munson does not specifically disclose that the mixture is partially hydrogenated prior to the contacting step. However, Munson discloses that the mixture is hydrogenated prior to the contacting step.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Munson by partial hydrogenating the mixture because the partial hydrogenation would hydrogenate acetylene without hydrogenate mono-olefins. (See col. 4, lines 5-8)

Claim 4:

Munson does not specifically disclose that the amount of olefin-complex metal salt is adjusted so as to complex essentially only the diolefins.

Munson discloses that the selective complexation of dienes (diolefins) is over mono-olefins. (See col. 10, lines 46-49)

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Munson by adjusting the amount of the olefin-complex metal salt as claimed because it is within one of skill in the art to adjust the amount of the complex metal salts to separate diolefins completely from mono-olefins which in turn would provide a purer diolefins and mono-olefins products.

Allowable Subject Matter

Claims 50-52 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not disclose or suggest a step of contacting the non-complexed mono-olefins and non-olefins with the olefin-complexing metal salt.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (571) 272-1452. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tam M. Nguyen
Examiner
Art Unit 1764

TN

A handwritten signature in black ink, appearing to read 'Tam', is written over a horizontal line.